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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/890,860	10/16/2001	Keith Herbert Dodd	899-26	7954
7590 04/22/2004			EXAMINER	
Nixon & Vanderhye 8th Floor 1100 North Glebe Road Arlington, VA 22201-4714			AUGHENBAUGH, WALTER	
			ART UNIT	PAPER NUMBER
			1772	

DATE MAILED: 04/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/890,860

Applicant(s)

DODD ET AL.

Examiner

Walter B Aughenbaugh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 53-63 is/are pending in the application.
- 4a) Of the above claim(s) 62 and 63 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 53-61 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 26, 2004 has been entered.

Acknowledgement of Applicant's Amendments

2. The cancellation of claims 2, 3, 10-17 and 20-52 in the amendment filed January 26, 2004 (Amdt. C) has been acknowledged by Examiner. Claims 1, 4-9, 18 and 19 were cancelled in Paper 8.
3. New claims 53-63 presented in Amdt. C have been received and considered by Examiner.

Election/Restrictions

4. Newly submitted claims 62 and 63 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

Inventions II (claims 62 and 63) and I (claims 53-61) are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process such as a process that involves only glass fiber rovings embedded in a matrix of

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a fluoropolymer, not a tape that comprises glass fiber rovings embedded in a matrix of a fluoropolymer.

5. Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 62 and 63 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

WITHDRAWN OBJECTIONS

6. The objection to claims 47, 49 and 52 made of record in paragraph 16 of Paper 10 has been withdrawn due to the cancellation of claims 47, 49 and 52 in Amdt. C.

WITHDRAWN REJECTIONS

7. The 35 U.S.C. 112 rejection of claim 15 repeated in paragraph 14 of Paper 10 has been withdrawn due to the cancellation of claim 15 in Amdt. C.

8. The 35 U.S.C. 103 rejection of claim 16 repeated in paragraph 15 of Paper 10 has been withdrawn due to the cancellation of claim 16 in Amdt. C.

9. The 35 U.S.C. 112 rejection of claims 11, 13, 43 and 51 made of record in paragraph 17 of Paper 10 has been withdrawn due to the cancellation of claims 11, 13, 43 and 51 in Amdt. C.

10. The 35 U.S.C. 103 rejections of the appropriate claims made of record in paragraphs 18-20 of Paper 10 have been withdrawn due to the cancellation of these claims in Amdt. C.

NEW REJECTIONS

Claim Rejections - 35 USC § 112

11. Claims 53 and 55-61 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In regard to claims 53 and 58, the structure intended to be recited by the recitation “extends longitudinally of a tube axis” is indefinite (i.e. the direction intended to be recited by the “extends longitudinally of a tube axis” recitation cannot be ascertained). Furthermore, what “extends longitudinally of a tube axis”- the element, the wall or the hollow interior? The “consisting essentially of a matrix of a fluoropolymer” recitation of claim 53 precludes the existence of rovings embedded in the matrix; as the language of claim 53 stands, the composite material can only consist of “a matrix of a fluoropolymer”. The “consisting essentially of a matrix of polyvinylidene fluoride” recitation of claim 58 precludes the existence of rovings embedded in the matrix; as the language of claim 58 stands, the composite material can only consist of “a matrix of polyvinylidene fluoride”. As stated in MPEP 2111.03, the transitional phrase “consisting essentially of” limits the scope of a claim to the specified materials or steps “and those that do not materially affect the basic and novel characteristic(s)” of the claimed invention. *In re Herz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976). The rovings materially affect the basic and novel characteristic(s) of the claimed invention, and therefore, cannot be included in the scope of the claim as drafted.

In regard to claims 55 and 59, the structure intended to be recited by the phrase “any adjacent contiguous layer” cannot be ascertained; furthermore, neither claims 53 and 58 nor the

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first five lines of claims 55 and 59 require that a layer be “contiguous”: what structure is the term “contiguous” used to recite? The two directions listed in claims 55 and 59, i.e. “a direction extending spirally around the tube axis” and “a direction extending substantially in the length of the tubular heat transfer element” are not mutually exclusive directions; a direction extending spirally around the tube axis necessarily extends substantially in the length of the tubular heat transfer element”, so these two directions are not different directions, and therefore, the common directions between “adjacent contiguous layer[s]” cannot be different: the two directions must be particularly pointed out as mutually exclusive directions so that the common directions between “adjacent contiguous layer[s]” are indeed different common directions.

Claims 56 and 60 recite the limitations “a first layer”, “a second layer” and “an intermediate layer”; there is insufficient antecedent basis for these limitations in the claim: claims 53 and 58 do not establish that the wall has layers. Claims 57 and 61 thus stand rejected under 35 U.S.C. 112 for lacking antecedent basis by virtue of the dependence of claims 57 and 61 upon claims 56 and 60. In further regard to claims 57 and 61, it is unclear what rovings are included in the “total rovings” recitation: the first and second layers and the intermediate layer, or all potential layers, including the first, second and all potential intermediate layers, including intermedeiated layers other than the intermediate layer?

Claim Rejections - 35 USC § 103

12. Claims 53-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swozil et al.

In regard to claims 53, 54 and 58, Swozil et al. teach an elongate tubular heat transfer element (a tube for a shell and tube heat exchanger, col. 1, lines 37-39) comprising a wall

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defining a hollow interior which extends longitudinally along the axis of the tube (a tube necessarily has a wall that defines a hollow interior that extends longitudinally along the axis of the tube). The fiber layer taught by Swozil et al. that comprises fibers coated with a fluorine-containing polymer (col. 1, lines 37-45 and 57-65 and col. 1, line 66-col. 2, line 15) corresponds to the wall claimed by Applicant. The wall of Swozil et al. is of monolithic construction (since it is "cast as a single piece", see attached Merriam-Webster Online Dictionary definition 2a of "monolithic") and necessarily has an inner surface and an outer surface. Swozil et al. teach that glass fibers are a suitable corrosion resistant fiber and that corrosion resistant fibers are necessary (col. 3, lines 1-9). Swozil et al. teach polyvinylidene fluoride as a suitable fluorine containing polymer (col. 1, lines 6-21 and col. 3, lines 4-12). Swozil et al. therefore teach that the wall is formed from a composite material consisting essentially of a matrix of polyvinylidene fluoride having rovings of boron-free chemically resistant glass fibers embedded in the matrix (Swozil et al. does not require that the glass fibers comprise boron, and therefore, boron-free chemically resistant glass fibers fall within the scope of the glass fibers taught by Swozil et al.). Swozil et al. teach that the fibers are oriented cross-wise at an angle of approximately 60° on the tube body (col. 1, line 66-col. 2, line 4 and col. 4, lines 19-23 and 44-48) and therefore teach that the rovings extend substantially in the length of the tubular heat transfer element and spirally around the tube axis.

Swozil et al. fail to explicitly teach that the rovings comprise from about 20% to about 60% by volume based upon the volume of the composite material.

Swozil et al., however, do teach that the fibers within the matrix reinforce the heat transfer element (col. 2, lines 12-18). Therefore, it would have been obvious to one of ordinary

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skill in the art at the time the invention was made to have determined the optimum volume of glass fiber in terms of percentage of the volume of the composite material to use in the heat exchange element of Swozil et al. that would yield the desired degree of reinforcement of the element depending on the desired end user result, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art in the absence of unexpected results. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

In regard to claims 55 and 59, Swozil et al. teach that the fibers that are coated with polyvinylidene fluoride are wound around the tube (col. 1, line 57-col. 2, line 35, col. 3, lines 23-25 and col. 4, lines 19-29 and 44-65). Each wind of the fibers of Swozil et al. is structurally equivalent to a layer as claimed by Applicant in claims 55 and 59. Swozil et al. therefore teach that the wall comprises a first layer (one of the fiber windings) adjacent the inner surface of the wall, a second layer (a fiber winding that is not immediately next to the winding corresponding to the first layer) adjacent the outer surface of the wall and at least one other layer intermediate the first and second layers (the winding or windings that are located between the winding that corresponds to the first layer and the winding that corresponds to the second layer). Swozil et al. teach that the fibers are oriented cross-wise at an angle of approximately 60° on the tube body (col. 1, line 66-col. 2, line 4 and col. 4, lines 19-23 and 44-48) and therefore teach that the rovings in each layer all extend substantially in a direction extending spirally around the tube axis and in a direction extending substantially in the length of the tubular heat transfer element. In regard to the recitation that “the rovings in each layer all extend substantially in a common direction which is different from the common direction of any adjacent contiguous layer”, all of the rovings in each of the layers extend in both directions that are claimed as possible “common

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direction[s]”; consequently, it is not possible that the respective rovings in the different layers extend in different directions as the language of claims 55 and 59 stands. In regard to claims 56 and 60, as discussed above in regard to claims 55 and 59, the first layer, second layer and intermediate layer, as defined above in regard to claims 55 and 59, all extend spirally around the tube axis and substantially in the length of the tubular heat transfer element since Swozil et al. teach that the fibers are oriented cross-wise at an angle of approximately 60° on the tube body (col. 1, line 66-col. 2, line 4 and col. 4, lines 19-23 and 44-48). Claims 57 and 61 have not been treated on their merits since the phrases “the first and second layers” and “the intermediate layer” lack antecedent basis (see 35 U.S.C. 112 rejection of claims 56, 57, 60 and 61).

ANSWERS TO APPLICANT'S ARGUMENTS

13. Applicant's arguments presented in the last four lines of page 7 of Amdt. C have been fully considered but are not persuasive. Applicant argues that the prior art of record does not teach “such a use for glass fibres”, where the “use” is presumably “to provide the necessary heat transfer characteristics”, but “the necessary heat transfer characteristics” are not stipulated in any claim of the instant application. As for the “about 20% to about 60%” recitation, this recitation has been treated in the 35 U.S.C. 103(a) rejection of claims 53-61 made of record in this Office Action; the claims are not rejected under 35 U.S.C. 102.

14. Applicant's arguments presented in pages 8-10 of Amdt. C regarding Swozil et al. have been fully considered but are not persuasive. In the last paragraph of page 8 of Amdt. C, Applicant argues that the Swozil et al. teach that “one cannot make a monolithic heat exchanger tube” and presumably that Swozil et al. teach away from a one-layer heat exchanger tube, but Applicant claims that the wall of the heat transfer element is “of monolithic construction”, not

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that the heat transfer element itself is “monolithic”. In the paragraph bridging pages 9 and 10 of Amdt. C, Applicant argues that “one skilled in the art reading Swozil et al would not interpret the passing reference to glass fibres... as referring to boron-free chemically resistant glass fibres” since “at the time Swozil et al was filed, boron-free chemically resistant glass fibres were not commercially available, to the best of the applicants’ knowledge”, but as stated in paragraph 18 of Paper 10, “Swozil et al. does not require that the glass fibers comprise boron, and therefore, boron-free glass fibers fall within the scope of glass fibers taught by Swozil et al.” An allegation that a boron-free glass fiber was not commercially available “at the time Swozil et al was filed” as Applicant argues is irrelevant because boron-free glass fibers fall within the scope of a general teaching of glass fibers such as the Swozil et al. teaching of glass fibers. At issue is not what one of ordinary skill in the art would have recognized “at the time Swozil et al was filed” as Applicant argues, but what one of ordinary skill in the art would have recognized at the time of Applicant’s filing of the instant application (i.e. the filing date of 09/890,860).

In the first full paragraph of page 10 of Amdt. C, Applicant relies on the single Example provided by Swozil et al. in arguing that the teaching that “Basically all fluorine-containing polymers which can be brought into the fluid state as a melt, solution or dispersion are suitable as a coating material” (col. 3, lines 9-12) applies only to “carbon filaments”; however, in making this argument, Applicant is ignoring the unambiguous teaching at col. 3, lines 1-9 that is cited in paragraph 18 of Paper 10 that glass fibers are “most suitable” as a fiber to be coated with any of the fluorine-containing polymer[s] taught at col. 3, lines 9-12. The teaching that “Basically all fluorine-containing polymers which can be brought into the fluid state as a melt, solution or dispersion are suitable as a coating material” plainly applies to glass fibers. In the second full

paragraph of page 10 of Amdt. C, Applicant argues that Swozil does not teach that the “inside of the tube [is] coated”, but the claims do not recite that the inside of the tube is coated.

15. Applicant’s arguments presented in pages 10-11 of Amdt. C regarding O’Connor and Yousuf et al. are moot since O’Connor and Yousuf et al. are not relied upon in the 35 U.S.C. 103(a) rejection of claims 53-61 made of record in this Office Action.

16. Applicant’s allegation presented in the sentence bridging pages 11-12 of Amdt. C that “Swozil et [a]l. teach that the whole outer surface of polytetrafluoroethylene tube should not be covered with glass fibres since that would have an adverse effect upon the heat transfer characteristics” is irrelevant and baseless. It is irrelevant because the claims of the instant application do not require that the entire tubular element “be covered with glass fibres”. It is baseless because there is no teaching, or suggestion, in Swozil et al. that “an adverse effect upon the heat transfer characteristics” is precipitated by coverage of the “whole outer surface of polytetrafluoroethylene tube” with glass fibers. The teaching that Applicant relies upon, that “Larger meshes only insignificantly change the heat transfer coefficients of the uncoated tubes” (col. 3, lines 34-36) contradicts Applicant’s argument that “an adverse effect upon the heat transfer characteristics” is precipitated by coverage of the “whole outer surface of polytetrafluoroethylene tube” with glass fibers: since an increase in the mesh size “only insignificantly change[s] the heat transfer coefficients of the uncoated tubes”, the heat transfer characteristics are practically unaffected by an increase in the mesh size (i.e. a decrease in the percent coverage of the tube). Larger mesh sizes are preferred by Swozil et al. because of the “intimate connection” formed between the mesh and the tube when larger mesh sizes are used (col. 3, lines 29-34), not because of heat transfer characteristic considerations as Applicant

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contends. N.B. the use of "stocking-like structures" (i.e. fabric sleeves or meshes) is not even a requirement of Swozil et al. (col. 3, lines 25-29); the yarn embodiment (col. 3, lines 25-26), not the mesh embodiment, is at least predominately relied upon in the 35 U.S.C. 103(a) rejection of claims 53-61 presented in this Office Action.

Conclusion


17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter B. Aughenbaugh whose telephone number is 571-272-1488. The examiner can normally be reached on Monday-Thursday from 9:00am to 6:00pm and on alternate Fridays from 9:00am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Walter B. Aughenbaugh

04/15/04 WBA


HAROLD PYON
SUPERVISORY PATENT EXAMINER
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4/15/04